Applying Social Cognitive Constructs of Motivation to Enhance Student Success in Online Distance Education

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This article relates findings from a review of the literature on six motivational constructs studied in traditional environments to online education concepts to identify methods for ensuring student success in online courses. The six motivational constructs are (a) self-efficacy, (b) locus of control, (c) attributions, (d) goal orientation, (e) intrinsic versus extrinsic motivation, and (f) self-regulation. The six motivational constructs have been thoroughly investigated in traditional face-to-face classrooms and in a wide variety of educational disciplines. Very few studies, however, have explored the significance of the constructs in the online environment. The purpose of this article is to discuss the areas of online education and academic motivation, and to suggest methods for ensuring student success in the online environment based upon the findings of the literature review.

This article relates findings from a review of the literature on six motivational constructs studied in traditional environments to online education concepts to identify methods for ensuring student success in online courses. The six motivational constructs are divided into three general families according to the type of cognitive structures they influence. These categories are (a) individuals' perceptions about their ability to accomplish a task (self-efficacy, locus of control, and attributions), (b) individuals' reasons or purposes for engaging in a task (goal orientation and intrinsic vs. extrinsic motivation), and (c) individuals' techniques and strategies for accomplishing a task (self-regulation). The six motivational constructs have been thoroughly investigated in traditional face-to-face classrooms and in a wide variety of

educational disciplines. Very few studies, however, have explored the significance of the constructs in the online environment.

The article is divided into three main sections. The first section introduces the area of online education and discusses concepts such as computer-mediated communication and interaction. The second section traces the history of academic motivation and describes the theoretical concepts and related research associated with the six motivational constructs. The third section suggests methods for ensuring student success in the online environment based upon the findings of the literature review.

ONLINE EDUCATION

Online education is one of the most dynamic and enriching forms of learning that exist today. Online education is a subcategory of distance education, which has been defined as the formal delivery of instruction in which time and geographic location separate students and instructors (Holmberg, 1989; McIsaac & Gunawardena, 1996; Verduin & Clark, 1991). The reasons for the advancement of online education are multifaceted. Online education overcomes the time and place constraints that restrict access to instruction in traditional educational settings. Other reasons include the relatively low cost and availability of computer technologies, increased pressures relating to employment, financial and family responsibilities, as well as the high cost of higher education and the limited availability of scholarships.

Online education offers appealing educational alternatives and provides life-long learning opportunities for those whom a traditional university setting does not work. Educational institutions around the world, whether at the elementary, secondary, or higher levels, offer a wide range of online courses in a wide spectrum of disciplines. For example, in the United States various universities and business corporations collaborate in establishing online universities that offer a wide variety of online courses in various disciplines. One such collaboration is the Western Governors University (WGU), a joint venture of 19 western states and 16 corporate partners to create a virtual university (Western Governors University, 2000). WGU has gathered hundreds of distance-delivered courses from institutions across the United States into their online catalog, which is comprised of courses that are offered by different institutions in the same subject area. Prospective online learners can select the course that best suits their needs.

The online environment uses computer-mediated communication (CMC) for the dissemination of instruction. CMC plays a significant role in online education and is the only means for interaction between students and instructors in the online environment (Riel & Harasim, 1994). Interaction is a distinguishing characteristic of CMC (Eastmond & Elwell, 1994). The importance of CMC and interaction is illustrated in the following sections.

Computer-Mediated Communication

While technology in general is the backbone of the online environment, CMC is the gateway for thousands of online learners in virtual communities. CMC refers to the process where students and instructors use networked computers for communication, interaction, and exchange of information (Berge & Collins, 1995). CMC is characterized by a highly interactive, multi-way synchronous or asynchronous communication (Romiszowski & Mason, 1996). Synchronous interaction allows students and instructors to exchange ideas and discuss course topics at the same time through a virtual discussion area. Asynchronous interaction provides opportunities for active input from all members of the online classroom and supports learner-centered learning environments. Examples of CMC include electronic mail, bulletin boards, newsgroups, and computer conferencing. The rapid growth of computer networks and the evolution of the Internet in the last decade have magnified the use of CMC to the point that it plays an essential role in the online delivery of instruction. Riel (1993) proposed that online learners interact with their peers, instructors, and content experts in ways that allow students to develop their critical and problem solving skills.

nComputer-mediated communication is the leading way to reach distance learners and it is proving to be a global communication system (Harasim, 1996). However, CMC is still a recent development in education and many online students encounter various difficulties with using such technologies. Novice students, for example, tend to feel apprehensive about using computer hardware, CMC, and the Internet in ways that may jeopardize intellectual interaction and their ability to succeed in a web-based course. Moreover, students who are technologically illiterate tend to spend many hours trying to figure out how to use online technologies, communicate with instructors, submit online assignments, or download class-related material from the class web site. Additional research is needed to determine students' perceptions about their ability to use online technologies. Findings

might enable instructors to provide students immediate feedback early in the semester to increase their perceptions with online technologies. In return, interaction might also increase helping students to persist in an online course.

Interaction

The review of the literature identified four types of interaction in a distance education course. Moore (1989) identified learner-content, learner-instructor, and learner-learner interaction. Hillman, Willis, and Gunawardena (1994) identified a fourth type of interaction, namely learner-interface interaction.

Learner-content interaction has been described as the intellectual interaction between the learner and the topic of study (Moore, 1989). According to Moore, learner-content interaction is an important concept of online environments because it changes learners' behavior toward an educational goal.

Learner-instructor interaction occurs between learners and instructors or team of subject-experts who prepared the course material. In this type of interaction, instructors are responsible for stimulating and continuously maintaining learners' interest in the topic, motivating students to learn, assessing students' progress, and finally providing support and encouragement to them (Moore, 1989).

Learner-learner interaction occurs among the learners of an online environment with or without the real-time presence of instructors. This type of interaction represents the communication between one learner with another learner, or with a group of learners, and takes place either synchronously, through "live" discussion chats, or asynchronously, through the exchange of electronic e-mail or posting of messages in bulletin boards.

Finally, learner-interface interaction has been defined as "a process of manipulating tools to accomplish a task" (Hillman et al., 1994, p. 34). This fourth type of interaction links the other three together. Learners must be able to use online technologies to interact and communicate with instructors, peers, and the course content. The absence of interaction can inhibit student success and may even force online students to drop out of online courses.

Various researchers have investigated interaction in the distance education environment and considered it as an important factor that can influence the

success or failure of a course (Kearsley, 1995; Keegan, 1988; Moore, 1989; Ross, 1996; Tsui & Ki, 1996; Vrasidas & McIsaac, 1999). Kearsley (1995) pointed out that a high level of interaction positively influenced the effectiveness of any distance learning course. Keegan (1988) viewed interaction as a key to effective learning and information exchange. Moore (1989) considered interaction as very important in the design of distance education. Ross (1996) stated that students who do not have the necessary skills to interact with their peers and the instructor using computers are more aware of technology than of the content of communication. Tsui and Ki (1996) found that students interacted more frequently over the course of the semester, as they became more comfortable using technology. Finally, Vrasidas and McIsaac (1999) found that structure, class size, feedback, and students' prior experiences with CMC are four major factors influencing student interaction.

Interaction plays an important role in ensuring student success in an online course. Additional research would provide practical suggestions for increasing interaction in order to help students persist in an online course.

MOTIVATION

Motivation is one of the most important components of learning in any educational environment (Maehr, 1984). Questions about why students engage in, pursue, and accomplish certain goals or tasks, or why they avoid others, have been the subject of scholarly inquiry since the writings of 5th-century BC Greek philosophers such as Plato and Aristotle.

The field of motivation in education is so broad and rich, that "in just 60 years there have been major upheavals in the field, metaphors replaced, important new areas uncovered, and essential new concepts introduced" (Weiner, 1990, p. 622). As a result, many definitions of motivation have emerged from the various theoretical approaches to motivation. The social cognitive theories of motivation have several concepts in common. In general, motivation increases individuals' energy and activity levels (Maehr, 1984). Furthermore, motivation directs individuals toward certain goals (Dweck & Elliot, 1983). Motivation also promotes initiation of certain activities and persistence in those activities (Stipek, 1988). Finally, motivation affects the learning strategies and cognitive processes individuals employ (Eccles & Wigfield, 1985).

Social cognitive learning theory views motivation as a function of individuals' thoughts rather than some instinct, need, drive, or incentive as examined by Freud (1915), Hull (1943), and Maslow (1954). Through the lens of social cognitive learning theory, six motivational constructs have been classified into three general families (Pintrich & De Groot, 1990). The first family refers to individuals' perceptions about their ability to accomplish a task. It includes constructs such as self-efficacy, locus of control, and attributions. The second family pertains to individuals' reasons or purposes for engaging in a task. It encompasses constructs such as goal orientation and intrinsic versus extrinsic motivation. The third family refers to individuals' techniques and strategies for accomplishing a task and includes self-regulation.

Individuals' Perceptions About Their Ability to Accomplish a Task

Perceptions of ability play an important role in all cognitive theories of motivation. The basic idea behind this family of motivational constructs revolves around students' beliefs that they are able to perform a task and that they are responsible for their own performance. These motivational constructs answer the student's question: "Can I do this task?"

Self-efficacy. Self-efficacy is a major component of Bandura's (1986) social cognitive learning theory. Bandura described self-efficacy as individuals' confidence in their ability to control their thoughts, feelings, and actions, and therefore influence an outcome. These perceptions of self-efficacy influence individuals' actual performances (Locke, Frederick, Lee, & Bobko, 1984; Schunk, 1981); emotions (Bandura, Adams, & Beyer, 1977; Stumpf, Brief, & Hartman, 1987); choices of behavior (Betz & Hackett, 1981); and finally the amount of effort and perseverance expended on an activity (Brown & Inouye, 1978).

According to Bandura (1986), individuals acquire information to help them assess self-efficacy from four principal sources: (a) actual experiences, (b) vicarious experiences, (c) verbal persuasion, and (d) physiological indexes. Individuals' own performances, especially past successes and failures, offer the most reliable source for assessing efficacy. Observation of similar peers performing a task conveys to observers that they too are capable of accomplishing that task. A form of verbal persuasion is when individuals are encouraged to believe that they possess the capabilities to perform a task

(e.g., being told "you can do this"). Finally, individuals might interpret bodily symptoms such as increased heart rate or sweating as a signal for anxiety or fear, resulting in an indication of their own lack of skills.

Information acquired from these sources does not necessarily influence self-efficacy. According to Bandura (1986), information gained through these sources is cognitively appraised before an efficacy judgment is made. Efficacy evaluation is an inferential process, in which individuals weigh and combine the contributions of personal and situational factors. These factors are: (a) their perceived ability, (b) the difficulty of the task, (c) the amount of effort expended, (d) the amount of external assistance received, (e) the number and pattern of successes and failures, (f) their perceived similarity to models, and (g) the persuader credibility (Schunk, 1989).

Various researchers have established that self-efficacy is a strong predictor of academic performance in traditional face-to-face classrooms. Multon, Brown, and Lent (1991) reviewed a comprehensive list of studies that examined self-efficacy in achievement situations. Findings suggested that self-efficacy beliefs were positively related to academic performance. In the same context, Ames (1984) and Nicholls and Miller (1994) found that students' self-perceptions of ability were positively related to achievement and student motivation.

Researchers in academic environments have studied the relationship between self-efficacy and constructs such as goal orientation (Anderman & Midgley, 1992; Urdan, Pajares, & Lapin, 1997; Zimmerman, Bandura, & Martinez-Pons, 1992) and self-regulation (Bandura, 1993; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Schunk, 1991). Results indicated that students who believed they were capable of performing certain tasks used more cognitive skills and metacognitive strategies and persisted longer than did those who did not feel they were capable of performing certain tasks (Pintrich & Garcia, 1991). Pintrich and De Groot (1990) reported that academic self-efficacy correlated with academic outcomes such as exam scores and final year grades. In a similar manner, Schunk (1991) stated that individuals who had a high sense of self-efficacy for accomplishing a task worked harder and persisted longer when they encountered difficulties, whereas those who did not feel efficacious might have quitted or avoided a task. In the same context, Bandura (1993) found that when individuals with high self-efficacy were challenged by a difficult situation they were more likely to attempt different strategies, or develop new ones, and were less likely to give up than people with a low sense of self-efficacy.

Locus of control. Another construct influencing students' perceptions of ability is locus of control. Locus of control is a relatively stable trait, a belief about the extent to which behaviors influence successes or failures (Rotter, 1966). It affects learning, motivation, and behavior (Pintrich & Schunk, 1996). Individuals with an internal locus of control believe that success or failure is due to their own efforts or abilities. On the other hand, individuals with an external locus of control are more likely to believe that other factors, such as luck, task difficulty, or other people's actions, cause success or failure.

Locus of control is an important factor in explaining students' school performance. Several researchers investigating locus of control in traditional environments found that students with a high internal locus of control earned better grades and test scores than did students of the same intelligence and with a low internal locus of control (Schunk, 1991; Shell, Colvin, & Brunning, 1995). In the same context, researchers found that locus of control was an important predictor of student academic achievement (Pajares & Miller, 1994; Randhawa, Beamer, & Lundberg, 1993; Zimmerman & Bandura, 1994; Zimmerman et al., 1992). In a study conducted in the distance education environment, Parker (1994) found that students with an internal locus of control were more likely to be successful than students with an external locus of control.

Attributions. Causal attributions are individuals' perceptions of the causes of various achievement outcomes (Pintrich & Schunk, 1996). Students may attribute their successes or failures to two general types of antecedent conditions: environmental factors and personal factors. Environmental factors include teacher feedback, social norms, or situational features. Personal factors include causal patterns, personal bias, prior knowledge, or individual differences. These two general categories of perceived causes influence the actual attributions that individuals will make in terms of whether they attribute their failure to low ability, lack of effort, bad luck, a hard test, a bad mood, fatigue, unfairness, anxiety, or just about any other explanation, justification, or excuse students produce for failure at a test or task.

According to Weiner (1986), most of the causes to which students attribute their successes or failures can be characterized in terms of three dimensions: (a) locus of causality, (b) stability, and (c) control. The locus-of-causality dimension is similar to Rotter's (1966) locus of control construct, and refers to whether a cause is perceived as being internal or external to the individual. For example, ability and effort are both classified as internal causes,

whereas task difficulty and luck are classified as external causes. The stability dimension refers to whether the cause is fixed and stable (e.g. aptitude and task characteristics), or whether it is variable and unstable across situations and over time (e.g., skills, knowledge, and chance). The controllability dimension refers to how much control a person has over a cause.

In summary, self-efficacy, locus of control, and attributions fall into the first general category of motivational constructs. This category represents students' perceptions about their ability to accomplish a task. The evidence presented points towards the importance of the three motivational constructs as predictors of academic success in traditional classrooms. One area of study that has not yet been completely examined is that of their effects on students' achievement in, and satisfaction with, an online course. More research is needed in the context of the online environment to predict student success and lower attrition rates.

Individuals' Reasons or Purposes for Engaging in a Task

Individuals' reasons or purposes for engaging in a task also play an important role in cognitive theories of achievement motivation. The basic idea behind this family of motivational constructs concerns students' incentives for engaging in a particular task. This family of constructs answers the student's question: "Why am I doing this task?"

Goal orientation. An achievement goal is what an individual is striving to accomplish (Locke & Latham, 1990). Dweck (1986) and Dweck and Leggett (1988) identified two motivational patterns that are associated with differences in individuals' goal orientation. The first is the "mastery response," associated with learning goal orientation. Learning goals have also been called mastery goals (Ames & Archer, 1988), task incentives (Maehr & Braskamp, 1986), and task involvement (Nicholls, Patashnick, & Nolen, 1985). The second motivational pattern is the "helpless response," associated with performance goal orientation. Performance goals have also been called ego incentive (Maehr & Braskamp, 1986), or ego involvement (Nicholls et al., 1985).

Individuals with a learning goal orientation strive to master a particular task and to improve themselves no matter how many mistakes they make. Their

primary goal is to obtain knowledge and improve their skills. Consequently, they may process information at a deep level (Miller, Behrens, Greene, & Newman, 1993; Nolen, 1988). Learning-goal-orientated individuals extend their learning beyond the minimum required and pursue the learning process as long as they perceive that they are making progress. They seek challenging tasks and increase their effort in the face of difficulty (Elliot & Dweck, 1988). Learning goal-oriented students are also more likely to engage in self-regulatory activities such as the use of monitoring, planning, and deep-level cognitive strategies (Ames & Archer, 1988; Anderman, 1992; Graham & Golan, 1991; Meece, Blumenfeld, & Hoyle, 1988; Nolen, 1988). Students who adopt learning goals tend to find the topic under study more intrinsically rewarding (Meece et al., 1988; Miller et al., 1993; Nicholls & Miller, 1994). Furthermore, students with a learning-goal orientation tend to achieve higher on tasks, learn more, and persist longer after failure, compared to performance-goal-oriented students (Diener & Dweck, 1978; Dweck & Leggett, 1988).

Individuals oriented toward performance goals are concerned with positive evaluations of their abilities in comparison to others. They are focused on how they are judged by others (such as peers, teachers, or parents). They want to look smart, and they try not to seem incompetent. For these reasons, they may avoid challenging tasks and exhibit low persistence when they encounter difficult work (Ames & Archer, 1988; Dweck & Leggett, 1988; Elliot & Dweck, 1988; Maehr & Midgley, 1991; Nicholls, 1989). By doing so, they adopt failure-avoiding strategies such as pretending not to care, making a show of "not really trying," or simply giving up (Jagacinski & Nicholls, 1987; Pintrich & Schunk, 1996). The evaluation of their performance is what matters to them, instead of learning the course material. Individuals with a performance-goal orientation tend to process information at a superficial level and generally fail to pursue learning beyond the level necessary to achieve positive recognition. Consequently, they frequently fail to retain the information they learn (Greene & Miller, 1996; Miller et al., 1993; Nolen, 1988; Pintrich & Garcia, 1991).

Research on the relationship between learning and performance goals indicated that these two types of goals are independent of one another (Hagen & Weistein, 1995), rather than opposite of one another as suggested in early motivational research (Meece & Holt, 1993). Pintrich and Garcia (1991) suggested that this independence means that it is possible for students to have both learning and performance goals at the same time. In

addition, researchers found that learning goals were positively related to self-efficacy, and self-regulation (Ames & Archer, 1988; Hagen & Weistein, 1995; Meece et al., 1988; Nolen, 1988; Schunk, 1995; Urdan et al., 1997). Findings indicated that learning goal orientation lead to higher self-efficacy and self-regulated performance than performance goal orientation.

Intrinsic and extrinsic motivation. Students' reasons or purposes for engaging in tasks are also influenced by their relative intrinsic or extrinsic motivation. Motivation that stems from factors such as interest or curiosity is called intrinsic motivation. Intrinsic motivation is the natural tendency to seek out and conquer challenges as individuals pursue personal interests and exercise their capabilities (Deci & Ryan, 1985). When students are intrinsically motivated, they tend not to need any incentives because the activity itself is rewarding to them. In contrast, extrinsic motivation is motivation to engage in an activity as a means to an end. Students who are extrinsically motivated tend to work on tasks because they believe that participation will result in desirable outcomes such as a reward (a good grade, or a diploma), teacher praise, or avoidance of punishment. Pintrich and Schunk (1996) suggested that intrinsic motivation and extrinsic motivation represent two different continua and each range from high to low.

In summary, goal orientation and intrinsic versus extrinsic motivation fall into the second general category of motivational constructs. This category examines students' reasons or purposes for engaging in a task. Researchers have identified the importance of the two motivational constructs as predictors of academic success in traditional classrooms. One area of study that has not yet been completely examined is that of their effects on students' achievement in, and satisfaction with, an online course. More research is needed in the context of the online environment in order to predict student success and lower attrition rates.

Individuals' Techniques and Strategies for Accomplishing a Task

Individuals' techniques and strategies for accomplishing a task also play an important role in cognitive theories of achievement motivation. The basic idea behind this motivational construct concerns students' utilization of cognitive skills and metacognitive strategies in order to accomplish a task. This construct answers the student's question: "How can I do this task?"

Self-regulation. Self-regulation refers to students' ability to understand and control their learning (Schunk & Zimmerman, 1994; Winne, 1995; Zimmerman, 1994). According to Zimmerman (1994), learners who self-regulate possess three important characteristics. First, they actively control their own learning by employing a range of cognitive strategies that assist in the construction of meaning and retention of information. Second, learners mindfully use metacognitive strategies such as planning and monitoring to control their own progress towards their educational goals. Finally, they are intrinsically motivated, focused upon the task at hand, and thoughtfully control emotional difficulties.

Pintrich and De Groot (1990) indicated that self-regulated learning consists of three components that affect academic performance: (a) cognitive and metacognitive strategies, (b) resources management and control, and (c) motivation. Schunk and Zimmerman (1994) suggested that students who monitor and regulate these components tend to overcome more educational difficulties than students who do not.

Cognitive and metacognitive strategies. Self-regulated students, who employ cognitive and metacognitive strategies plan, organize, self-instruct, and self-evaluate at various stages during the process of information acquisition. Cognitive strategies are defined as the behaviors and thoughts in which students are engaged in while studying (Payne, 1992). Metacognition is defined as individuals' knowledge about their own cognitive processes (Flavell, 1976, 1987).

Pintrich, Smith, Garcia, and McKeachie (1991) suggested that cognitive and metacognitive strategies can be categorized and compared within the contextual environment of a specific course. These categories include (a) rehearsal, (b) elaboration, (c) organization, (d) critical thinking, and (e) metacognitive self-regulation strategies. Rehearsal strategies include naming items from a list to be learned, actively reading assignments according to a plan, listening to lectures, and rewriting class notes (Talbot, 1997). Elaboration strategies require students to edit notes, compare reading assignments with lecture notes, summarize, paraphrase, and to find their own examples from real-world events and problems (Talbot, 1997). Organization strategies include outlining, grouping, selecting the main idea from reading passages, and paying attention to headings, subheadings, diagrams, tables, figures, charts, and graphs (Talbot, 1997). Critical thinking strategies refer to the degree to which students apply previous knowledge to new situations to

solve problems, make decisions, or make critical evaluations with respect to standards or excellence. Finally, metacognitive self-regulation refers to the awareness and control of cognition (Pintrich et al., 1991). Planning, monitoring, and regulating are examples of processes that build metacognitive self-regulatory activities.

Resource management strategies. Besides self-regulation of cognition and metacognition, students must be able to (a) manage and regulate their time and their study environments, (b) monitor their effort, (c) learn from peers, and (d) seek help and support from peers and instructors (Pintrich & De Groot, 1990). These resource management strategies enable students to manage their environment and the available resources.

Time management involves scheduling a time to study, planning weeks or months ahead, choosing a location to study, and effectively using the study time for the realistic setting of goals. Study environment management refers to the physical place where students study. Choosing a location provides students with control over possible distractions or availability of supportive materials or people. Effort monitoring refers to students' ability to monitor and manage their effort and attention in order to persist through boring tasks as well as distractions from those tasks. Peer learning refers to dialogue between peers and the intellectual exchange of ideas and information that can help students clarify course materials and discover information that would not be able to do on their own. Finally, help seeking refers to the process where students ask peers and instructors to clarify confusing course material and hence expedite achievement.

Motivation. Self-regulation of cognitive and metacognitive strategies provides a good description of students' decisions of when they will study, where they will study, what they will study, and most importantly, how they will study. However, the employment of cognitive and metacognitive strategies does not provide a full picture of self-regulated learning. Even though students may possess skills and strategies, they may choose not to employ them (Wyatt et al., 1993).

Motivation is an important factor to self-regulated strategy use (Ames & Archer, 1988; Diener & Dweck, 1978; Nolen, 1988; Pintrich & De Groot, 1990). Zimmerman (1989) stated that students who are motivated perceive themselves as self-efficacious and goal-directed. As a result, self-regulated students are often academically superior to students who do not self-regulate their learning experiences (Pintrich & De Groot, 1990; Zimmerman, 1986; Zimmerman & Martinez-Pons, 1986, 1988).

Pintrich and De Groot (1990) described three components that characterize student motivation that can be monitored and measured. These components are (a) the value component, (b) the expectancy component, and (c) the affective component.

The major idea behind the value component of motivation is that task value encourages student interest in the task, which in turn fosters a deep approach to learning. How students value a task depends upon how meaningful, important, or interesting it appears to them (Pintrich, 1989). Therefore, how students view a task creates a value that affects motivation and engagement in that task.

The expectancy component of motivation includes the concept of control of learning, which was found to affect students' motivation for engagement in a learning task (Pintrich et al., 1991). Control of learning refers to students' beliefs that their own efforts to learn will result in positive outcomes. Pintrich et al. (1991) described internal and external control beliefs. Students who believe that learning outcomes are subject to their own efforts have internal control beliefs. On the other hand, students who believe that learning outcomes are subject to the teacher or factors other than themselves have external control beliefs.

The third component of motivation focuses on the students' emotional feelings about the learning tasks, and specifically test anxiety or fear of assessment. The affective component of motivation consists of the cognitive and the emotional parts. The cognitive part refers to students' negative thoughts that may obstruct performance, such as worry about the outcome of an exam. The emotional part refers to the affective and physiological aspects of anxiety.

A review of the literature uncovered numerous theoretical and empirical studies on self-regulation and its components in traditional classroom environments (Garcia, 1995; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Schunk & Zimmerman, 1994; Tuckman, 1993; Zimmerman et al., 1992). Garcia (1995) found that students use their self-efficacy beliefs to fuel their self-regulatory motivational strategies. Pintrich and De Groot (1990) examined the relationship of academic performance among seventh-graders to their self-efficacy, intrinsic value, test anxiety, cognitive strategy use and self-regulation tendency, and found that self-regulation tendency, self-efficacy, and test anxiety to be the best predictors. Tuckman (1993) obtained

similar results for college students with the addition of grade importance as another strong predictor variable. Zimmerman et al. (1992) demonstrated support for a causal model that showed a combined influence of self-efficacy and goals on academic achievement among ninth and tenth graders.

In summary, self-regulation falls into the third general category of motivational constructs. This category explores individuals' techniques and strategies for accomplishing a task. Researchers have identified the importance of self-regulation as a predictor of academic success in traditional classrooms. One area of study that has not yet been completely examined is that of its effects on students' achievement in, and satisfaction with, an online course. More research is needed in the context of the online environment to predict student success and lower attrition rates.

IMPLICATIONS

Given the present body of literature, it is evident that there are several implications for researchers, online instructors, and instructional designers of online courses. Due to the theoretical similarities of the motivational constructs in each of the three general families, the authors chose to present implications for one construct from each family. These are self-efficacy, goal orientation, and self-regulation.

The implications are presented in two parts. The first part corresponds to the first family of motivational constructs, which is individuals' perceptions of ability to accomplish a task. Specifically, it provides suggestions for the improvement of students' self-efficacy beliefs with online technologies. The second part corresponds to the other two families of motivational constructs, which are individuals' reasons to engage in a task and individuals' techniques and strategies for accomplishing a task. This part provides suggestions for instructional design and development of effective online courses and targets increasing students' goal orientation and self-regulation.

Students' Self-efficacy Beliefs with Online Technologies

Self-efficacy plays a significant role in predicting academic achievement. Pintrich and De Groot (1990) suggested that the improvement of students'

self-efficacy beliefs leads to increased use of cognitive and metacognitive strategies and, thereby, higher academic performance. Students' confidence with online technologies is important in the context of online education where increased levels of self-efficacy beliefs toward the technology used might be needed for online students to interact with their peers and instructors. Increased levels of interaction may also lead to a decrease in attrition rates.

Improvement of students' self-efficacy. According to Bandura (1986), individuals acquire information to help them assess self-efficacy from four principal sources: (a) actual experiences, (b) vicarious experiences, (c) verbal persuasion, and (d) physiological indexes. In order to improve students' self-efficacy beliefs with online technologies, instructors need to increase the four sources of students' self-efficacy appraisal.

Actual experiences. Instructors should identify students who lack the ability to use technology in an online course and should provide early feedback. At the beginning of the semester instructors should make sure that all students are able to visit the courses' web page and be able to use an e-mail system for communication. If students have any problems with technology, instructors and technical support stuff should work together for students to overcome any problems.

Students' perceptions of their skills with technology can be measured using a self-efficacy questionnaire administered by the instructor at the beginning of an online course. An example of such questionnaire is the Online Technologies Self-efficacy Survey (OTSES) (Miltiadou & Yu, under review). The questionnaire can be posted on the Internet and students' answers could be collected either by e-mail or by using a database application. After analyzing results, instructors could warn students of their lack of confidence with technology and advise them accordingly. For example, instructors could advice students to work on an interactive tutorial covering all aspects of technology. The provision of early feedback and remediation could result in students persisting in the course. This may translate to a decrease in the high attrition rates evidenced in online courses (Dille & Mezack, 1991).

Students who lack computer skills face major frustration and may drop the course because they cannot deal with technology. One way to prevent students from dropping out is to organize, possibly during the semester's orientation week, a one-day technology meeting, during which students will be taught how to use an e-mail system, the Internet, and the conferencing

system used in the course. Furthermore students should also be taught on how to submit online assignments. During the technical orientation meeting, students could create and post on the Internet their personal web page that includes a photograph and a short biography. This is a great way for classmates and instructor to put a face to the name. The meeting would be also useful for students to get to know each other and the instructor of the course.

In case students are not able to visit the campus during the technology orientation meeting, the educational institution should provide technical support assistance through e-mail or a toll free number. Online tutorials detailing the daily procedures of the course and describing how to use technology should also be developed. Such tutorials could teach the use of e-mail and CMC systems, and basic concepts such as word processing, Internet searching, opening and saving files, and uploading or downloading files. Some may argue that creating online tutorials will require a huge budget the institution might not be willing to pay. However, funds for such a department might be available from the increased amount of students. Alternatively, institutions might charge students a small technology fee to overcome the cost barrier.

If none of these is possible, course instructors should consider teaching students how to use technology during the first few weeks of the course. This might take away from the course content, but in the long run it will pay off. Alternatively, a teaching assistant, if one is available for an online course, could provide individualized help to online students with technology issues.

Students' prior experience with technology has been found in the literature as one of the factors that influence interaction in an online environment (Vrasidas & McIsaac, 1999). Although many students might be new to the online modality of delivering instruction, the more contact and hands-on experiences they have with technology prior to or at the beginning of the semester, the more likely students are to persist in the course.

Vicarious experiences. Vicarious experience is another principal source of self-efficacy appraisal. An example of vicarious experience is virtually pairing up students for moderating threaded asynchronous discussions. Students uncomfortable with technology would observe their peers moderate online discussions and as a result, they too would learn how to do it.

Verbal persuasion. Students' being told "you can do this task" is the third
the four principal sources where students acquire information for self-
efficacy assessment. Immediate and positive feedback from instructors on
students' questions and assignments is one example of verbal persuasion.
Instructors should announce virtual office hours, where synchronously or
asynchronously could offer advice, solve students' questions, and comfort
students with statements such as "you can learn how to use technology
after a lot of practice, " or "keep up the good work." Constant instructor-
student interaction and positive feedback may raise students' comfort levels
with technology.

Physiological indexes. Students who face technology problems tend to
experience high stress levels because they might have missed an assignment
deadline. These technology problems might be due to technology failure, or
students' lack of knowledge for a conferencing system. Constant communi-
cation between students and instructors might solve this problem. One
solution, for example, is the submission of an assignment through e-mail or
regular mail. In the meantime, students, instructors, and technology support
stuff should cooperate in order for a solution to be found.

Improvement of interaction. Increasing students' confidence beliefs with
technology might also lead to an increase in interaction as described by
Moore (1989) and Hillman et al. (1994). Moore (1989) suggested that online
students need to interact with the instructor, the course content, and their
peers. The only way for any interaction to take place is for students to
interact with the interface, as Hillman et al. (1994) proposed.

Students enrolled in online courses are required to use technology for the
daily procedures of the course. Such procedures often require students to
(a) interact with peers and instructors through e-mail, (b) use a web browser
to access class material, (c) search for journal articles using the Internet,
online databases, and the institution's libraries, (d) submit assignments
online, and (e) participate in weekly asynchronous threaded discussions.
These tasks are examples of the four types of interaction. All types of
interaction are vital to online environments because if one type is missing, or
it is not well thought and planned, then online courses might not be
effective and successful. If learners have difficulties using the hardware and
software necessary for interaction, then all their efforts might be consumed
on how to figure out how to use technology and little effort will be spent on
the actual class content (Ross, 1996). Thus, students' confidence with

technology plays a significant role for all types of interaction to be present in an online environment, and for the course to be successful.

Instructional design and course development principles for online courses. The abundance of online courses that exist today does not guarantee that these courses are all instructionally sound. There are a number of design and development issues and principles that course developers need to consider to design high quality courses.

First, course developers need to answer some very basic questions such as (a) is the course content appropriate to be taught on the Web? (Porter, 1997) (b) who is the target audience? (c) what are the course goals and objectives? (d) how will objectives be assessed? (e) what are the limitations of technology? Instructors who simply post lectures and assignments on the Web are supplementing their course, but this would not usually constitute an instructionally sound course. Course developers should refer to instructional design models, procedures, and techniques and follow the necessary steps to ensure high quality courses (Dick & Carey, 1990; Gagne, Briggs, & Wager, 1992; Smith & Ragan, 1999). Several other good sources for advice regarding instructional design principles for distance learning include Eastmond and Ziegahn (1995), Hirumi and Bermudez (1996), Ritchie and Hoffman (1997), Savenye (1999), and Starr (1997). Additionally Hannafin and his colleagues have developed guidelines for designing open-ended learning environments, which might form part of the distance learning course (Hannafin, Hall, Land, & Hill, 1994; Hannafin & Land, 1997).

In addition, instructional designers could follow Keller's (1987) Attention, Relevance, Confidence, and Satisfaction (ARCS) model to develop an intrinsically interesting course, which would enhance students' motivation. Keller's (1987) ARCS model would be used to develop courses that would capture students' attention, enhance content relevance with their prior knowledge and experiences, build students' confidence, and enhance their satisfaction with instruction and content material.

When students enroll in an online course they are confronted with a wide variety of goals to strive for, activities to engage in, and challenges to face across various academic and social domains. It is the instructors' responsibility to encourage students to find learning a valuable task. Instructors should make an effort to enhance the relevance of course contents with students' educational backgrounds and experiences. Incorporating case

studies that approximate real life situations and matching students' interests might increase students' learning goal orientation and their value for the course content. In addition, such case studies would capture students' attention and might motivate them to engage in meaningful learning. Instructors should not substitute the learning experience with easy assignments because students might lose interest in the course and as a result, they might drop out (Locke, 1996; Locke & Latham, 1990).

Instructors should also create well-planned and structured online courses, including syllabi that are clear and concise. All necessary information about the course should be posted on the class web page before the beginning of the semester. Such information should include the weekly schedule of readings, assignments, and discussion topics. Vrasidas and McIsaac (1999) found that structure influences interaction in an online environment. Students should know exactly what is expected of them and the precise steps they need to follow to accomplish the objectives of the course. A well-structured course might decrease students' anxiety, enabling them to succeed. Thus instructors should help students control their own pace for finishing assignments, posting messages to various discussion questions, and reading the required material. Johnston (1997), for instance, recommends developing a hyperlinked syllabus, providing students access to many other types of resources.

Interactivity should also be integrated into online courses for instructional designers and instructors to ensure success. A well designed distance education course should include many topics for online discussions, feedback from students, the instructor, as well as experts, and links to online sources of pertinent information such as journal articles, databases, and web pages with relevant to the course information. A strong sense of interactivity could also be emphasized with a certain degree of humor (Parker, 1999). Humor can make the class more enjoyable, it usually generates a feeling of sincerity among the participants, and can lighten the burden of the learning curve for both the students and the instructor.

Course developers also need to either design their own interface, or use a web-course template provided by the distance learning department at their institution. Web page design is not a simple step and should not be taken lightly. The interface should be user-friendly, allowing for sufficient white space and consistent placement of text and images on each web page. A dark font size on white background should be used because often students

print out web pages to be able to read the material easily. An appropriate font style and size, universal for both PC and Macintosh computers, is required for students to be able to read without difficulty. Colors should be subtle and should complement the content. Navigation should include a site map for easy access of all web pages by the students.

At the end of the design and development phases, course developers should post all necessary information on the class web page before the beginning of the semester. Such information should include the weekly schedule of readings, assignments, and discussion topics.

The issue of online exams is another major one in online courses. Often instructors feel that they do not have control over such examinations. One way to solve the problem is to have students submit essay-type questions, case studies, or research papers, on which it would be difficult for them to cheat.

A final instructional design consideration is the value of conducting formative evaluation and revision on the distance learning course and materials, as specified in most instructional design models. Porter (1997) in her chapter on determining whether courses are appropriate for distance delivery includes a useful checklist for evaluating distance learning courses. Another example of criteria to be considered in evaluating distance courses in schools is presented by Hawkes (1996).

CONCLUSION

In light of high attrition rates within online distance education environments, and a growing number of traditional courses using online technologies, traditional as well as online students are likely to experience distance education methods in the near future. Providing information that reveals learners' motivation and strategies for successful engagement in distance learning environments is likely to prove beneficial for both distance education and traditional education that is supported through online education methods.

More research is needed to shed light on which motivational constructs can be identified as predictors of success in an online environment. The lack of

sufficient studies coupled with the rapid growth of online courses demand investigation in the area so that attrition rates decrease and learners achieve their educational goals. The rapid technological advances that are an everyday phenomenon at the beginning of the 21st century offer the basis for collecting more empirical data to enable educational institutions, instructional designers, and educators to know even before a course begins, learners' perceptions, goals, and organizational skills. This knowledge would contribute vital information for further quests in understanding the online modality of education and therefore help to both lower attrition rates and increase the design of instructionally sound web-based courses.

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